REMARKS

This Amendment is filed in response to the Office Action dated June 19, 2007. All objections and rejections are respectfully traversed.

Claims 1, 3-8, and 18-26 are in the case.

Claims 1, 4, and 5 have been amended to better claim the invention.

Claim 2 and 9-17 have been cancelled without prejudice.

Claims 18-26 have been added to better claim the invention.

CLAIM REJECTIONS

At paragraph 8 of the Office Action, claims 1 and 3 were rejected under 35 U.S.C. §102(b) as being unpatentable in view of Tanizaki *et al.* Japan Patent No. 4-274174 issued on September 30, 1992, (hereinafter "Tanizaki"). Also at paragraph 9 of the Office Action, claims 1 and 4 were rejected under 35 U.S.C. §102(e) as being unpatentable in view of Hirsch *et al.* U.S Publication No. 2004/0209133 published on October 21, 2004, (hereinafter "Hirsch"). Further, at paragraph 11 of the Office Action, claim 2 was rejected under 35 U.S.C. §103(a) as being unpatentable over Tanizaki and in view of Tan *et al.* U.S. Patent No. 5,687,759 issued on November 18, 1997 (hereinafter "Tan") and claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over Tanizaki and in view of Guay *et al.* U.S. Publication No. 2005/0058879 published on March 17, 2005 (hereinafter "Guay").

The present invention, as set forth in the representative claim 1, comprises:

A shutter mechanism for controlling reactants in a direct oxidation fuel cell system, having at least one fuel cell including a membrane electrode assembly, comprising:

a moving component disposed within the fuel cell between a source of a reactant and the membrane electrode assembly, ***said moving component having a plurality of laterally displaced protrusions***; and

a receiving element forming a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions, such that when said moving component is placed adjacent to said receiving element, the flow of said reactant is controlled.

Tanizaki discloses a fuel cell comprising a fuel chamber equipped with a fuel supply route for supplying fuel to and discharging fuel from a fuel oxidation electrode, an air chamber, an air reduction electrode equipped with collector plates, and an electrolyte chamber. Adjacent to the collector plates is a laterally slidable shutter plate with a plurality of apertures formed therein. The apertures correspond directly with apertures in the collector plate so that when the shutter plate is slid laterally in one direction or the other, the shutter plate blocks fuel from entering the electrolyte chamber (i.e., the corresponding apertures no longer align) thereby controlling the fuel flow in the reaction system.

Hirsch also discloses a fuel cell with a laterally moving shutter that is adjacent to the collector plate within a fuel cell. Hirsch's disclosed adjustable fuel delivery regulation assembly is a shutter which includes two corresponding perforated components (i.e., plates). The two plates can be positioned relative to one another such that apertures in each component are aligned in certain ways in order to control fuel flow through the cell. For example, blocking the flow of fuel is provided by the perforated shutter plate so that the apertures in the shutter plate and the apertures in the non-movable corresponding plate no longer align.

Tan discloses an industrial servovalve system having an inlet, an outlet, a primary valve supported on a casing and a single valve plug that is movable between a closed position (e.g., blocking flow through the casing) and an open position which allows for variable flow through the casing. Tan is directed to control of a flow through a single valve by a pressure control chamber/mechanism. The fluid flow through the system is controlled by the valve plug attached to a primary valve, which is in turn controlled by a

pilot valve. The pilot valve forces the primary valve into the aperture when the current supply to the solenoid in the pilot valve is interrupted.

Guay discloses an arrangement for a direct methanol fuel cell which includes a fuel cartridge that supplies a source of fuel to the direct methanol fuel cell. The fuel cartridge has a surface area enhanced planar vaporization membrane located within its embodiment. In addition, the arrangement may also include a fuel reservoir to receive fuel from the fuel cartridge that also has a planar vaporization membrane. These planar vaporization membranes are used during pervaporation to vaporize fuel as it moves through the membranes, rather than being vaporized in advanced of the membranes (e.g., allowing the storage of liquid in the cartridge).

Applicant respectfully urges that neither Tanizaki, Hirsch, Tan, nor Guay show Applicant's claimed novel ***moving component having plurality of laterally displaced protrusions*** and ***a receiving element forming a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions.***

Applicant's claimed invention is directed to a reactant control mechanism in a direct oxidation fuel cell system, having at least one fuel cell including a membrane electrode assembly (MEA). The reactant control mechanism is made up of a plurality of protrusions laterally displaced on a plate, which moves in a perpendicular direction adjacent to an anode collector of the MEA. The anode collector has a plurality of openings which correspond to the protrusions on the reactant control mechanism's movable plate. As such, to control the reactant flow in the cell, the plate of laterally displaced protrusions are moved (e.g., perpendicularly) so that they substantially plug the corresponding openings in the anode collector.

Neither Tanizaki, Hirsch, Tan, nor Guay address laterally displaced protrusions on a perpendicularly movable reactant control plate. Both Tanizaki and Hirsch disclose shutters with a laterally moving/sliding shutter plate which requires an additional amount of lateral space and volume to be reserved in the fuel cell's dimensions. Neither Tanizaki nor Hirsch disclose perpendicularly moving a shutter plate, particularly a plate with a ***plurality of laterally displaced protrusions*** to meet with corresponding openings. Tan discloses a single (large) servovalve assembly having only a singular protrusion. Applicant respectfully urges that it would not have been obvious to one of ordinary skill in the art based on Tan with any other reference to make a membrane out of a plurality of laterally displaced protrusions over a wide surface area compared to the thickness of the membrane in order to control the flow of vapors/fuels through a fuel cell. Guay merely discloses a membrane for vaporizing fuel.

In addition, Applicant respectfully urges that the Tanizaki and Hirsch patents each teach away from Applicant's claimed novel invention by teaching laterally moving/sliding shutter plates. In particular, laterally moving plates generally would not have protrusions, which would otherwise hinder the sliding action of the plates due to their corresponding relationship with openings on a receiving plate. Without a complex (and non-disclosed) track/groove system, laterally moving adjacent plates with protrusions and corresponding openings would not function properly. Thus, Tanizaki and Hirsch teach away from moving a ***plurality of laterally displaced protrusions*** to match with ***corresponding openings***.

Applicant respectfully urges that the Tanizaki, Hirsch, Tan, and Guay patent documents are each legally precluded from anticipating the claimed invention under 35 U.S.C. §102(b) or (e) and also legally precluded from rendering the claimed invention obvious under 35 U.S.C. §103(a) because of the absence from each of Tanizaki, Hirsch, Tan, and Guay of Applicant's claimed novel ***moving component having plurality of lat-***

erally displaced protrusions and ***a receiving element forming a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions.***

All independent claims are believed to be in condition for allowance.

All dependent claims are believed to be dependent from allowable independent claims, and therefore in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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